

<b>BROOKHAVEN NATIONAL LABORATORY</b> Safety & Health Services Division  <b>INDUSTRIAL HYGIENE GROUP</b> Standard Operating Procedure: Field Procedure	NUMBER <b>IH62410</b>
	REVISION <b>FINAL rev1</b>
SUBJECT:  <b>Local Exhaust Ventilation Periodic System Validation</b>	DATE <b>10/31/05</b>
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### **1.0 Purpose/Scope**

This procedure provides a standardized method for conducting periodic validation of the effectiveness of local exhaust ventilation (LEV) systems. This procedure is based on routine testing of the acceptable operating parameters of the system determined in initial system evaluations using IH 62400. By completing this SOP, BNL will:

- Document the performance of LEV systems and verify operation in accordance with design specifications
- Verify compliance of operations with applicable codes

Periodic tests are to be made:

- Throughout the life of the system to ensure continuing performance. BNL's frequency for periodic testing is:
  - **12 months** (or per manufacturer's recommendation) when OELs are exceeded,
  - **36 months** is recommended when OELs are not exceeded and the ventilation system is not critical for worker protection.
- Whenever major modifications are made to the system
- On start-up of a system that has been dismantled, out-of-service, and reassembled, and
- When complaints of poor performance are made by operating personnel.

### **2.0 Responsibilities**

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This procedure will be implemented through the RCD Facility Support Group Leader and the SHSD Industrial Hygiene Group Leader.

### 3.0 Definitions

None.

### 4.0 Prerequisites

- 4.1 Prior to testing a local exhaust system, verify the calibration and operability of the test equipment.
- 4.2 Observe area postings and obtain approval to enter the test area, as required.

### 5.0 Precautions

#### 5.1 **Hazard Determination:**

- 5.1.1 By its very nature, a test may be done in areas where chemicals or radiation contamination is known or suspected to be present. Exposure to these contaminants can have significant health effects. These hazards must receive a hazard evaluation by a cognizant ESH professional. This operation may use hazardous chemicals that could result in employee exposure (smoke tubes). The gases, vapors, or aerosols that the exhaust systems are used to capture could cause exposure to the tester. Appropriate measures to minimize contact with solid or liquid contaminant and inhalation of solid, liquid, vapor, or gas contaminant must be made.
- 5.1.2 Air testing meters used in this procedure do not generate in Hazardous Waste. Smoke tubes or candles may be used, but their environmental impact is not significant. Expended smoke tubes and candles are not considered hazardous wastes. The test equipment design does not cause significant ergonomic concerns in routine use.

#### 5.2 **Personal Protective Equipment**

- 5.2.1 Hand: Contact with aerosol liquid should be minimized as it could pose a

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health risk. Use of this operation in areas of known or suspected chemical or radiological contamination requires the use of disposable gloves. Exam-style, splash gloves are acceptable. Acceptable elastomers are: Nitrile, PVC, and Natural Rubber.

5.2.2 Body:

- If contact of the body with contaminated surfaces is anticipated, a disposable suit should be used. Acceptable Chemical protective clothing (CPC) materials include: *Tyvek®*, *KleenGuard®*, and cotton. Disposable garments must be discarded as per *Hazardous Waste Management Division* instruction.
- If contact with potentially contaminated surfaces is not expected, protective clothing is optional. However, if personal clothing items become contaminated, they must be surrendered for BNL cleaning or disposal.

5.2.3 Foot:

- If contact of the feet is anticipated with contaminated surface, disposable shoe coverings, boots or booties should be used. Acceptable CPC material include: *Tyvek®*, *KleenGuard®*, and rubber.
- If contact with potentially contaminated surfaces is not expected, shoe coverings are optional. However, if personal shoes become contaminated, they must be surrendered for BNL cleaning or disposal.

5.2.4 Respiratory: Under normal use, respiratory protection is not required. If chemical or radiological levels from contamination in the area cause the OSHA, ACGIH, or DOE standards to be exceeded, respirators are required.

5.2.5 Eye: Safety Glasses with side shields are required.

## 6.0 Procedure

6.1 Testing Equipment:

- Air ventilation tester: Velometer, Anenometer, Balometer, Smoke tubes or candles, etc. Follow the appropriate SHSD IH SOP on the operation of the meter/equipment.



6.2 Pre-Testing Inspection of LEV system equipment

6.2.1 Verify that the exhaust ventilation system is operating.

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- 6.2.2 Inspect the exhaust system and its associated ductwork and mechanical components for any obvious signs of damage (e.g., missing or damaged seals, breached ductwork, excessive rust, or unusually loud motor noise). Notify Plant Engineering and the system owner of these conditions. Do not test if the system is not operable or not of adequate integrity.
- 6.2.3 Verify that changes have not been made since the *initial evaluation*. Changes that would require a new *initial evaluation* include changes in the type of hazards, the rate of hazard generation, or mechanism of hazard generation.
- 6.2.4 If there are questions or concerns regarding the operation of the system, review the original design drawing, manufacturer's literature, or any other appropriate information.

### 6.3 Measuring Operational Parameters

- 6.3.1 Following the drawing of the system or digital photograph on the specific *LEV System Periodic Validation Test* record form for the exhaust system to be tested, locate the pre-determined sampling point.
  - 6.3.2 From the specific *LEV System Periodic Validation Test* record form, determine the appropriate operational parameter(s) for the ventilation system.
  - 6.3.3 Measure the appropriate operational parameter(s) using an IH Series 62nnn SOP or RCD Facility Support SOP on the test method. If a BNL SOP is not available, follow the manufacturer's recommendation in conducting the measurement.
  - 6.3.4 Record the results on the *LEV System Periodic Validation Test Record* and the *Local Exhaust Ventilation* test label or tag.
- 6.4 Record-keeping: Provide A copy of the *LEV System Periodic Validation Test Record* to the Divisional Safety Coordinator, the Process/Operation and Exhaust system owner/management, and any other interested parties. The original test report is retained by organization responsible for periodic testing in accordance with the record keeping requirements of SEP ADM-001. A copy of the record should be sent to SHSD IH lab.

## 7.0 Implementation and Training

- 7.1 Tests shall be performed by persons who have demonstrated the competence to satisfactorily perform the tests as evidenced by experience and training. All persons

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must have met the qualification criteria set in IH50300 *BNL IH Program and IH Group Training & Qualification Matrix*.

## 8.0 References

- 8.1 American Conference of Governmental Industrial Hygienists (ACGIH). Industrial Ventilation: A Manual of Recommended Practice.
- 8.2 American Conference of Governmental Industrial Hygienists (ACGIH). *Guidelines for Testing Ventilation Systems*; 1991.

## 9.0 Attachments

- 9.1 *Local Exhaust Ventilation Test Label/sticker*
- 9.2 *Local Exhaust Ventilation Periodic Validation form*
- 9.3 *Job Performance Measure*

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## 10.0 Documentation

Document Development and Revision Control Tracking		
<b>PREPARED BY:</b> <i>(signature on file)</i> <b>R. Selvey</b> IH Group Leader Date 11/20/02	<b>REVIEWED BY:</b> <i>(signature on file)</i> <b>J. Peters</b> IH Field Team Leader Date 11/22/02	<b>APPROVED BY:</b> <i>(signature on file)</i> <b>R. Selvey</b> IH Group Leader Date 11/22/02
ESH Coordinator/ Date: <i>none</i>	Work Coordinator/ Date: <i>none</i>	SHSD Manager / Date <i>none</i>
QA Representative / Date: <i>none</i>	Training Coordinator / Date: <i>none</i>	Filing Code: <b>IH52.05</b>
Facility Support Rep. / Date: <i>(signature on file)</i> C. Weilandics; <b>RCD Facility Support</b> ; Date 11/22/02	Environ. Compliance Rep. / Date: <i>none</i>	Effective Date: <b>11/22/02</b>
ISM Review - Hazard Categorization <input type="checkbox"/> High <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Low/Skill of the craft	Validation: <input type="checkbox"/> Formal Walkthrough <input checked="" type="checkbox"/> Desk Top Review <input type="checkbox"/> SME Review Name / Date:	IMPLEMENTATION: Training Completed: tracked in BTMS Procedure posted on Web: 10/31/05 Hard Copy files updated: 10/31/05

Revision Log		
Purpose: <input type="checkbox"/> Temporary Change <input type="checkbox"/> Change in Scope <input checked="" type="checkbox"/> Periodic review <input checked="" type="checkbox"/> Clarify/enhance procedural controls		
Changed resulting from: <input type="checkbox"/> Environmental impacts <input type="checkbox"/> Federal, State and/or Local requirements <input type="checkbox"/> Corrective/preventive actions to non-conformances <input checked="" type="checkbox"/> none of the above		
Section/page and Description of change: Add Section 10 format and corrected Section 7 Training and /Qualification. Added Attachment 9.3 JPM.		
<i>R. Selvey 10/31/05 (signature/date on file)</i> SME Reviewer/Date:	Reviewer/Date:	Reviewer/Date:
Purpose: <input type="checkbox"/> Temporary Change <input type="checkbox"/> Change in Scope <input type="checkbox"/> Periodic review <input type="checkbox"/> Clarify/enhance procedural controls		
Changed resulting from: <input type="checkbox"/> Environmental impacts <input type="checkbox"/> Federal, State and/or Local requirements <input type="checkbox"/> Corrective/preventive actions to non-conformances <input type="checkbox"/> none of the above		
Section/page and Description of change:		
<i>(signature/date on file)</i> SME Reviewer/Date:	Reviewer/Date:	Reviewer/Date:

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## ATTACHMENT 9.1

# Periodic Validation Test Sticker/Label

<b>Local Exhaust System test</b>			
Equipment ID:			
<b>Operating Parameters Validation Test</b>			
<b>Test Date</b>	<b>Test by: Full Name</b>	<b>Pass/Fail</b>	<b>Next Due</b>

## IH62410 ATTACHMENT 9.2



## LOCAL EXHAUST VENTILATION PERIODIC VALIDATION

Environment, Safety & Health Directorate

### System Identification

DIVISION	BUILDING	ROOM/AREA
SYSTEM DESCRIPTION		<b>Sample</b> This FORM is prepared uniquely for each piece of equipment
SYSTEM TYPE	MANUFACTURER	
EQUIPMENT ID#	MODEL	SERIAL#
BLDG MANAGER	ESH Coordinator	OTHER CONTACT

EVALUATOR(S) NAME	SIGNATURE	TEST DATE
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### System Description (Photograph or Drawing)







**LOCAL EXHAUST VENTILATION  
PERIODIC VALIDATION**  
Environment, Safety & Health Directorate

Field Observations and Measurements-

METER:	METER SN		
METER CALIB. DATE	COMMENTS		
Parameter:	Point	Acceptable Operational specification	Observed Measurement
	A		
	B		
	C		
	D		

METER:	METER SN		
METER CALIB. DATE	COMMENTS		
Parameter:	Point	Acceptable Operational specification	Observed Measurement
	A		
	B		
	C		
	D		

METER:	METER SN		
METER CALIB. DATE	COMMENTS		
Parameter:	Point	Acceptable Operational specification	Observed Measurement
	A		
	B		
	C		
	D		

## Local Exhaust Ventilation- Periodic Evaluation Job Performance Measure (JPM) Completion Certificate

Candidate's Name	Life Number:	Qualification Number: <b>HP-IHP- 62410</b>
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### Knowledge of the Principles of Exhaust Ventilation Investigations

Criteria	Qualifying Standard	Unsatisfactory	Recovered	Satisfactory
<b>Hazard Analysis</b>	Understands the need to perform a hazard analysis of the sampling area and potential exposure to the sampler.			
<b>Personal Protective Equipment</b>	Understands the need to be aware of potential exposures to the sampler and how to determine appropriate PPE.			
<b>Sampling Protocol</b>	Understands the ventilation system design parameters and logic necessary to appropriately select sampling locations for accurate measurements.			
<b>Analysis of data</b>	Understands the need to perform analysis on the sampling data to assess the effectiveness of the ventilation system and potential exposure to the sampler, worker, public and environment. Also, to recommend corrective actions as necessary.			

### Practical Skill Evaluation: Demonstration of Sampling Methodology

Criteria	Qualifying Performance Standard	Unsatisfactory	Recovered	Satisfactory
<b>Sampling Equipment</b>	Knows where equipment needed for the procedure is located and how to properly sign it out.			
<b>Obtaining design specifications</b>	Describe finding the sources from "Initial Evaluation Forms" that states the design specifications of the equipment to be tested.			
<b>Selecting the proper parameters to measure</b>	Can describe which design specification are appropriate for be measured and what an acceptable variation in measured versus design value would be.			
<b>Meter Operation</b>	Demonstrates the proper meters that would be used to determine if design specifications are met.			
<b>Record forms</b>	Shows how to correctly and completely fill all forms associated with this SOP.			
<b>Data Analysis</b>	Knows the correct criteria and operating ranges. Shows how to correctly analyze data and compare to acceptable criteria.			
<b>Report preparation and distribution</b>	Knows how to document the assessment and the correct distribution.			

I accept the responsibility for performing this task as demonstrated within this JPM and the corresponding SOP.

Candidate Signature:	Date:
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I certify the candidate has satisfactorily performed each of the above listed steps and is capable of performing the task unsupervised.

Evaluator Signature:	Date:
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